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EXAMINER

JACKSON, TYRONE D

ART UNIT PAPER NUMBER

2862

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/716,813

Applicant(s)

MORRISON ET AL.

Examiner

Tyrone Jackson

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-16, 18-21 and 23-27 is/are rejected.
- 7) ☒ Claim(s) 13, 17, 22, 28, and 29 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/20/03 5/17/04
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: Page 8, line 19 refers to reference numeral 27 that does not exist; Page 9, line 10 refers to "10" which should be "12"; Page 10, line 13 refers to "34" which should be "36"; Page 11, line 25 refers to "54" which should be "56"; Page 12, line 12 contains a misspelling of the word "tow". Appropriate correction is required.

Drawings

The drawings are objected to because of the following informality: "transmitter" is misspelled in Fig. 8. Appropriate correction is required.

Claim objections

Claim 3 is objected to because the phrase "of the present invention" is not allowed. Appropriate correction is required.

Claim 22 is objected to because the terms "residual currents" and "OFF interval" lack antecedent basis. Appropriate correction is required.

Claim 23 is objected to because it contains two periods. Appropriate correction is required.

Claims 24-28 are objected to because they appear to have improper dependency. It appears from the claim terminology "the method" that these claims

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depend on claim 23 and not claim 21. For purposes of examination, the office is assuming claims 24-28 depend on claim 23.

Claims 24-28 are objected to because the term "step" lacks antecedent basis in each claim. Appropriate correction is required.

In claim 27, the phrase "number of loop turns" lacks antecedent basis and it is unclear as to which "loop turns" are being referred to. Appropriate correction is required.

In claim 28, the terms "residual currents" lack antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12, 14-16, 18-21, 23-27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dzwinel {4,641,100} in view of Mooney et al. {5,119,028} and further in view of Whitton {PGPUB 20030169045}.

Regarding claim 1-3, 23, and 29, Dzwinel teaches an airborne electromagnetic surveying system comprising a tow assembly for connection to an aircraft with the tow

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assembly including a flexible support frame **4** (column 4, line 4), a transmitter section **9**, a receiver section **12** (column 4, lines 24-25) and a transmitter driver **10** (power generator) that's linked to the transmitter section in a spaced apart relationship **Fig 1.**, such spaced apart relationship being operable to reduce noise, where the transmitter driver and transmitter section in cooperation enable the system to generate an earthbound electromagnetic field pulse effective for geological surveying. Dzwinel shows the receiver section substantially aligned with the central axis of the transmitter section **Fig 1.**

Dzwinel does not teach a non-linear gain amplifier linked to the sensor means that enables non-bucking high linear gain amplification of the earth response to the electromagnetic field pulse. Mooney et al. teaches a differential amplifier (a non-linear amplifier that enables a linear range of gain amplification) linked to the sensor means. It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an amplifier as taught by Mooney et al. in the surveying system taught by Dzwinel because it is common practice in the related art to use a gain amplifier to amplify the signal from the sensing means. One skilled in the art would have been motivated to generate the claimed invention with a reasonable expectation of success.

Neither Dzwinel nor Mooney et al. teach a computer adapted to activate the pulse to define an "ON" interval and to measure the earth response by operation of the sensor means in an "OFF" interval so as to generate selected survey data, which survey data is stored to a memory linked to the computer. However, Whitton teaches that all

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airborne time domain electromagnetic systems define an "ON" and "OFF" interval (page 2, para. 28-29) and measures the earth response during the "OFF" interval (page 2, para. 33). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the time domain system taught by Whitton so that the receiver could measure the secondary magnetic field induced in the earth with minimal noise from the transmitter.

Also, implementing software instructions into any system or apparatus would be within the level of any one of ordinary skill in the art

Regarding claims 4 and 24, neither Dzwinel nor Mooney et al. teach having the sensor measure during the "ON" interval. Whitton teaches that some electromagnetic systems have been developed to successfully record secondary magnetic field information during the "ON" interval (page 2, para. 33). It would have been obvious to one of ordinary skill in art to adapt the system taught by Dzwinel and Mooney et al. to have the sensor measure during the "ON" interval because more comprehensive data would be attained.

Regarding claim 5, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the transmitter section includes a generally flexible transmitter support frame 4, which supports a transmitter coil.

Regarding claims 6, 7 and 18, Dzwinel does not teach the transmitter section consisting of a plurality of interconnectable transmitter section frame members that define a polygonal profile that can be adjusted to alter the surface area. Whitton does teach employing interconnectable transmitter section frame members in the shape of a

polygon that enable the surface area of the transmitter section to be altered for different applications of the system because the sections can assemble and disassemble **Fig. 5a** (page 5, para. 85). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the surveying system taught by Dzwinel with the interconnectable members taught by Whitton to allow for easier shipping (page 5, para 85).

Regarding claim 8, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the thin structure of the support frame enables a relatively large effective surface area with reduced drag during flight **Fig 1**.

Regarding claims 9 and 10, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the tow assembly is connected to the aircraft by means of a central cable at a first end connected to the aircraft, the central cable also including a second end opposite to the first end, and where a plurality of connecting cables are connected between the second end of the central cable and a plurality of points generally evenly distributed along the circumference of the transmitter section **Fig 1**.

Regarding claim 11, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the receiver section includes a receiver support frame disposed generally along the central axis of the transmitter section **Fig 1**.

Regarding claim 12, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the receiver support frame is connected to the transmitter support frame by means of a plurality of connecting cables **11**.

Regarding claims 14 and 15, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the sensor coil is elastically suspended inside the receiver support frame **Fig 1**.

Regarding claim 16, Dzwinel shows a receiver support frame consisting of a plurality of interconnectable receiver section frame members **Fig. 1**.

Regarding claim 19, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the transmitter is located in the aircraft and is connected by a transmission cable **19** to the transmitter section.

Regarding claim 20, Dzwinel teaches the airborne electromagnetic surveying system as described above, where the support frame includes a stabilizer (shock absorber, column 4, lines 7-12) for stabilizing the movement of the tow assembly during flight.

Regarding claim 21, Dzwinel teaches the airborne electromagnetic surveying system as described above in which the aircraft is a helicopter **1**.

Regarding claim 26, Dzwinel teaches an airborne electromagnetic surveying method that includes adding additional receiver coils for multi-dimensional surveying (column 2, lines 1-4).

Regarding claim 27, it is well known in the art that increasing the number of loop turns in the transmitter taught by Dzwinel would increase the magnetic field strength emitted which would help detect different geophysical targets.

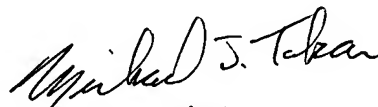
Allowable Subject Matter

Claims 13, 17, 22, 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Remarks

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Tyrone Jackson


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